

CT 00-013
PATENTRemarks

Reconsideration of this application is in view of the remarks that follow is requested. Claims 1, 3-11, 13-18, 20 and 21 remain pending in the application.

Claim Rejections - 35 U.S.C. § 103

The Examiner has rejected claims 1-3, 5-8, 10-16 and 18, 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over Hsu et al., U.S. Patent No. 5, 858,314, hereinafter referred to as Hsu, in view of Ashmead et al., U.S. Patent No. 5,534,328, hereinafter referred to as Ashmead. The Examiner in making this rejection states that Hsu discloses an apparatus comprising: a monolithic ceramic carrier defining a fuel processor, the fuel processor including a vaporization zone and a reaction zone including a reforming catalyst material; at least one channel formed in the monolithic structure and having a catalyst material formed therein for transporting a vapor in the vaporization zone; and inlet channel for introducing liquid fuel into the fuel processor; and an outlet channel for transporting hydrogen enriched gas out of the fuel processor. The Examiner acknowledges that Hsu fails to disclose a sintered device, as claimed by the applicants. The Examiner thus asserts that Ashmead teaches a integral, sintered, monolithic ceramic carrier such as claimed by the applicants, formed by "thermal fusion bonding", which the Examiner asserts is essentially the definition of "sintering". Thus, the Examiner asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was

CT 00-013
PATENT

made to substitute the carrier of Ashmead into the device of Hsu in light of the teaching of Ashmead. The Examiner further enumerates specific rejections as to the remaining claims. The applicant in response respectfully disagrees with the rejections.

The applicant again asserts that Hsu discloses a reactor built using discrete pieces of ceramic plates, with catalyst deposited on them and having thermally conducting plates interleaved between these ceramic plates, and gas manifolds to feed reactants and to get output gases. The entire assembly is sealed in a gas tight enclosure/housing to make the reformer unit. Hsu utilizes discrete pieces to assemble the unit, which according to the disclosure are housed within a gas-tight housing to form a peripheral axial manifold. The assembly of Hsu connects with these gas manifold to feed reactants and to the output gasses, inevitably forming a large unit. For an assembly of this type, one would require gas tight sealing between the plates, and if the plates are made of ceramic materials then be of sufficient thickness to avoid cracking during assembly.

The applicants assert that the assembly of Hsu is not sintered in the manner of the applicants, nor would it be obvious to sinter, or use thermal fusion bonding of the layers of Hsu, in light of the disclosure of Ashmead.

The applicants again assert that Hsu discloses a very cumbersome method of making the reformer unit that is comprised of discrete layers that are simply packaged together. The end result is not sintered as is the device claimed by the

CT 00-013
PATENT

applicants, nor would have it been possible to sinter the layers as done by the applicant in light of the material composition of the layers disclosed in Hsu. The applicant asserts that as stated in column 6, lines 22-29 of Hsu, as pointed out by the Examiner, the disclosure of Hsu states that "the reforming plate 14 can further include a ceramic support plate that has a reforming material coated thereon, as illustrated in FIGS. 2A and 2B. Thus, the reforming plate 14 of the present invention can include any multi-stacking reforming plate structure that includes suitable reforming catalysts that promote the reformation of a hydrocarbon fuel into suitable reaction species." The applicants assert that disclosed in column 6 is the inclusion of a ceramic material as a support plate for the reforming plate. The conductive plate is not formed of a ceramic material that is able to be sintered with the reforming plate, in a manner similar to the applicants layers. Ashmead discloses thermal fusion bonding of layers as a result of the material composition of the layers. There is nothing in the disclosure of Hsu to teach or make obvious the substitution of layer materials to be compatible with the teaching of Ashmead to provide for thermal fusing. The applicants assert that thermal fusion bonding of the reforming plate of Hsu and the conductive plate can not be achieved without the introduction of additional materials or alteration of the disclosed materials.

The applicants assert that there is no teaching in the disclosure of Hsu to suggest the inclusion of ceramic materials that are capable of being sintered as does the applicant, nor is there any suggestion for the modification of Hsu by the teachings of Ashmead. The applicants further assert that the combination of reference teachings is improper unless the prior art suggests such a combination.

CT 00-013
PATENT

Accordingly, the applicants assert that the modification of Hsu by Ashmead does not only fail to disclose and thus make obvious the applicant claimed device, it is improper in that there is no disclosure in the cited patents to make the combination and thus such modification is not obvious.

It is understood that one cannot pick and choose among the individual elements of assorted prior art references to recreate the claimed invention. Accordingly, the Examiner has the burden to show some teaching or suggestion in the references to support the particular combination. The test to be undertaken is whether one skilled in the art with the references before him could have made the combination of elements claimed without the exercise of invention. The art applied should be viewed by itself to see if fairly disclosed doing what the applicants' have done. The mere fact that it is possible to find two isolated disclosures which might be combined in such a way to produce a new device does not necessarily render such production obvious unless the art also contains something to suggest the desirability of the proposed combination. The mere fact that these disclosures can be combined does not make the combination obvious in that the art does not contain anything to suggest the desirability of combination.

In addition, the applicants' assert that it is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The Examiner in making the combination of Hsu with the teachings of Ashmead, has chosen to disregard the required inclusion in the device of Hsu to

CT 00-013
PATENT

utilize a stack of thermally conducting plates formed of metals such as aluminum, copper, iron, steel alloys, nickel, nickel alloys, chromium, chromium alloys, platinum, and nonmetals such as silicon carbide and other composite materials, interspersed with catalyst plates. The applicants assert that there is no disclosure to form the conductive plates of a ceramic material (comparable to the applicants' material layers) in that ceramic is not a sufficiently conductive material for use as Hsu's conductive plate. Applicants' claimed invention, unlike Hsu and Hsu in view of Ashmead clearly states a sintered monolithic ceramic carrier which is disclosed as formed as a direct result of the ceramic green sheet materials chosen to form the layers. The applicants assert that the devices as taught by these prior art references fails to result in the device as claimed by the applicants. The applicants have clearly defined the ceramic material composition of the layers that comprise the device thereby resulting in a monolithic, sintered ceramic carrier.

The integral, sintered, monolithic ceramic unit disclosed and claimed by the applicants results in a small compact unit for portable power application. As disclosed, the applicants' device is fabricated using multilayer ceramic technology. The required features of the various components (vaporizer, reformer, combustor etc. in the fuel reformer unit) required for the final unit are processed separately on individual ceramic sheets in green state (unsintered) and then they are laminated maintaining the structural integrity and sintered to form an integral, sintered, monolithic ceramic unit. The unit becomes uniform in composition in that the layers are no longer discernible as individual layers due to the sintering process. The resultant monolithic structure characteristics are unique to the applicants device and

CT 00-013
PATENT

not disclosed or taught by Hsu. To simply substitute a thermally fused carrier of Ashmead into the device of Hsu is not permissible and does not disclose or make obvious the applicants claimed device. Hsu clearly require the inclusion of multiple conductive material layers and identifies specific materials to achieve such.

In the applicants claimed device, communication between the various components is achieved by forming the required channels in the green state. This way it is possible to achieve simple and gas tight connections between the components during the sintering process, such that the only external required connections would be fuel inlet connected to the fuel tank and gas out put connected to the fuel cell. The compact design minimizes the total surface area (requiring minimum insulation around the reactor) and minimizes the losses into the surrounding through the reactor, thereby maximizing the fuel efficiency for portable power applications.

Accordingly, the applicants respectfully disagree with the rejections and assert that the claims are not obvious in light of the teaching of Hsu, in view of Ashmead. The applicant disagrees with the Examiner's assertions regarding the obviousness and asserts that Hsu fails to disclose the integral, sintered, monolithic three-dimensional device and therefore additionally assert that further modification of Hsu with the teaching of Ashmead also fails to disclose the applicant's claimed device.

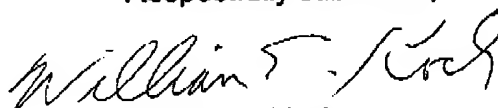
CT 00-013
PATENT

Therefore the applicants assert that claims 1-3, 5-8, 10-16 and 18, 20 and 21 are in a condition for allowance. In light of the above remarks, the Applicant believes the 35 U.S.C. 103 rejection in light of the teaching of Hsu, in view of Ashmead has been overcome. Notice to that effect is requested.

The Applicant believes that the subject application, is in condition for allowance. Such action is earnestly solicited by the Applicant. In the event that the Examiner deems the present application non-allowable, it is requested that the Examiner telephone the Applicant's attorney or agent at the number indicated below so that the prosecution of the present case may be advanced by the clarification of any continuing rejection.

SUMMARY: Reconsideration is respectfully requested. In view of the foregoing amendments and remarks it is believed that the application, including claims 1, 3-11, 13-18, 20 and 21, is now in condition for allowance. Notice to that effect is respectfully requested. Authorization is hereby given to charge any fees necessitated by actions taken herein, including any extension of time fees, to Deposit Account 502117.

Respectfully submitted,



William E. Koch

SEND CORRESPONDENCE TO:

MOTOROLA, INC.
Law Department
Customer Number: 23330Attorney for Applicant
Reg. No. 29,659
Tel. (602) 952-3486